SYLLABUS

FOR

POST GRADUATE DIPLOMA IN HARDWARE TECHNOLOGY AND APPLICATIONS (P.G.D.H.T.A.)

One Year P.G. Diploma Course

SAURASHTRA UNIVERSITY
RAJKOT
(Effective from June 2013)

Department of Electronics
Saurashtra University Campus
Rajkot-360005
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# SAURASHTRA UNIVERSITY
## DEPARTMENT OF ELECTRONICS
### PGDHT&A SYLLABUS
#### SEMESTER I & II

### SEMESTER I *(24 Credits)*

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**Elective Papers:**

1. Web Design & Development
2. Server Administration : Windows and Linux
3. Programming with C++
4. Windows 7 Configurations
5. Emerging Technology
Post Graduate Diploma in Hardware Technology & Application (PGDHT A)

Detailed Syllabus

SEMESTER- I
UNIT - 1  PASSIVE & ACTIVE COMPONENTS

Resistors: Types of resistors, color code, parallel and series connections, basic uses.
Capacitors: Type of capacitors, color code, parallel and series connection, basic uses.
Inductor: Concept of a coil - inductance, making of an inductor, basic uses.
Transformer: Concept types and uses.
Semiconductors: Structure of atom, vacancy, conductor, semiconductor insulator. Intrinsic semiconductor, doping,
P and N types of semiconductors.
Diodes: P-N Junction, Zener
Transistor: BJT, FET, MOSFET, working and characteristics.
Integrated circuits: Basic concepts.

UNIT - 2  CONCEPTS OF CIRCUITS

Definition of current and voltage, KCL and KVL (Kichoff’s current Law and Kirchoff’s voltage law), Ohm's Law, R-L, R-C and R-L-C circuits.

UNIT - 3  BASIC DIGITAL CONCEPTS

Number System - Binary - Octal - Hex
Basic logic gate - AND-OR-NOT-XOR, NOR, NAND
Flip flop: R-S D and JK.
Shift registers, counters encoder and decoder
Few Boolean function and simplifications.

UNIT - 4  HOW TO USE VARIOUS LABORATORY INSTRUMENTS AND DEVICES

Current meter, voltage meter, Multimeter, Oscilloscope, function generator, soldering iron, PCB, disordering pump.

Recommended-Books:

2. Solide - State devices and circuits By: S.P. Bali,
New age international publishers Ltd. Willey Eastern Ltd.
3. The Basic Electronics By : B. L. Thereja. S.Chand & Co.
UNIT - 1  INTRODUCTING HARDWARE


UNIT - 2  MOTHERBOARD

Motherboard Form Factors: obsolete form factors, ATX and other modern form factors, What is the chipset, Roles of Chipset in motherboard, Traditional North/South Bridge Architecture, Hub Architecture, Features and block diagram of current chipset, Super I/O chip, Motherboard connectors, Motherboard selection criteria (knowing what to look for).

UNIT - 3  EXPANSION BUSES


UNIT - 4  MEMORY

Memory Basics: ROM, DRAM, Cache Memory: SRAM, RAM Types and Performance: Fast page Mode DRAM, Extended Data Out RAM (EDO), SDRAM, DDR SDRAM, DDR2 SDRAM, DDR3 SDRAM, RDRAM, Memory modules, SIMMs, DIMMs and RIMMs (Physical Memory), Memory Banks, RAM upgrades, The system Logical Memory Layout.

Recommended-Books:

3. PC Hardware” by Michael Meyers, Scott Jernigan. TMH Edition
4. Hardware Bible” by W. L. Rosch, Techmedia Publication
UNIT - 1  KEYBOARD AND POINTING DEVICES

Keyboards, Enhanced 101-key keyboard, 104 key keyboard, Keyboard Technology: key switch design, the keyboard interface, typematic functions, keyboard key numbers and scan codes, international keyboard layouts, keyboard/mouse interface connectors, USB keyboards, keyboards with special features, Keyboard troubleshooting and repair, keyboard disassembly, cleaning a keyboard, keyboard recommendations, Pointing Devices: Ball Type mice, Optical mice, Pointing Device Interface types, Mouse troubleshooting, scroll wheels, trackpoint, alternative pointing devices, Wireless Input Devices, Power Management features of wireless input devices, Troubleshooting Wireless Input Devices.

UNIT - 2  MICROPROCESSOR TYPES AND SPECIFICATIONS

PC components: Introduction
Microprocessor History, PC Processor Evolution, 16-bit to 64-bit Architecture Evolution
Processor Specifications: Data I/O Bus, Address Bus, Internal Registers, Processor Modes
Processor Features: System Management Mode (SMM), Superscalar Execution, MMX Technology, Dynamic Execution, Dual Independent Bus Architecture, Hyper Threading Technology, Multicore Technology
Overview of Processor Socket and slot types, Math Coprocessor, Overview of current processors, Processor cooling and overclocking overview

UNIT - 3  BIOS AND CMOS SETUP

BIOS Basics, Motherboard ROM BIOS: ROM Hardware, ROM shadowing, ROM chip types, ROM BIOS Manufacturers, BIOS Hardware/Software
Upgrading the BIOS: where to get your BIOS update, determine your BIOS version, Checking the BIOS date, Backing Up Your BIOS, Backing Up Your BIOS setup (CMOS RAM) setting, Upgrading a Flash BIOS
CMOS setup specifications, Plug and Play BIOS: PnP device IDs and ACPI.

UNIT - 4  POWER SUPPLIES

Form Factors used by Computer Cases, Motherboards, and Power Supplies, Types of Form Factors, Types of Computer Cases, Measures and Properties of Electricity, AC and DC, Hot, Neutral, and Ground, Some Common Electronic Components, Selecting a Power Supply, Types and Characteristics of Power Supplies, How to Select a Power Supply, Protect Yourself and the Equipment against Electrical Dangers, Protect Yourself against Electrical Shock and Burns, Protect the Equipment Against Static, Electric or ESD, Protect Against Electromagnetic Interference, Surge Protection and Battery Backup, How to Work Inside a Computer Case,
with the Power Supply Fans, Problems with Overheating, Power Problems with the Motherboard, Replacing the Power Supply. Power protection systems: surge suppressors, phone line surge protectors, line conditioners, backup power.

**Recommended Books:**

3. Modern all about keyboard and mouse by Manhar Lotia BPB Publication
4. Hardware Bible” by W. L. Rosch, Techmedia Publication
UNIT - 1  VIDEO HARDWARE


UNIT - 2  AUDIO HARDWARE

How sound works in a PC: sound capture basics, recorded sound formats, playing sounds, MIDI, other file formats, video applications, streaming media. Getting the right sound card: processor capabilities, speaker support, recording quality, jacks, extra features, audio cables, speakers. Installing a sound card: Physical installation, installing drivers, installing sound programs, installing applications. Troubleshooting Sound: Hardware Problems, Configuration Problems, Application Problems, Sound card Benchmarking, Speaker selection criteria, theater and surround sound considerations, microphones.

UNIT - 3  OPTICAL STORAGE : CD and DVD


UNIT - 4  REMOVABLE STORAGE

The Role of Removable Media Drives: Flash Memory media, Magnetic Disk media, Magnetic Tape media, Flash Memory Devices, Microdrive Technology, High Capacity Magnetic Storage Devices, Floppy Disk Drives, Tap Drives, Magneto Optical Drives.
Recommended Books:

3. Modern all about floppy disk and drives by Manhar Lotia and Pradeep Nair BPB Publication
4. PC Hardware” by Michael Meyers, Scott Jernigan. TMH Edition
SET OF 10 PRACTICALS BASED ON PAPER 1, 2, 3 & 4
Post Graduate Diploma in Hardware Technology & Application (PGDHT A)

Detailed Syllabus

SEMESTER- II
UNIT - 1  MAGNETIC STORAGE PRINCIPLE

Magnetic storage, History of Magnetic storage, How Magnetic Field are used to store data
Read/Write Head Designs: Ferrite, Metal-in-Gap, Thin Film, Magneto-Resistive Heads, Giant-Magneto Resistive Heads
Data Encoding Schemes: FM encoding, MFM encoding, RLL encoding, Encoding scheme comparisons, Partial-Response, Maximum-Likelihood Decoders, Areal Density

UNIT – 2  HARD DISK STORAGE

Hard Disk Storage: Definition of a Hard Disk, Hard Drive Advancement, Form Factors overview

UNIT – 3  PRINTERS AND PRINTING TECHNOLOGY

Printer types and features, types of printers, printer features, installing and sharing printers, how to install a printer using Windows, Steps to install a network printer, manage printer features and settings, share an installed printer, supporting printer, printer languages, using windows to manage printers, printer consumables, maintaining printer, printer maintenance kits, upgrade the printer memory or hard drive, cleaning a printer, online support for printers, updating printer firmware, Troubleshooting Printers: printer does not print, problems with laser printer, inkjet printer and impact printers

UNIT – 4  SCSI

SCSI Chains: SCSI IDs, Termination
SCSI Flavors, SCSI-1, SCSI-2, SE, HVD, and LVD SCSI, SCSI-3, Last Notes on Termination, Bus Mastering, SCSI Cables and Connectors, SCSI Performance
Troubleshooting SCSI: Power and Connectivity, Boot Firmware, Memory Chips, Storage, I/O, Device Drivers
Costs and Benefits of SCSI: SCSI vs. IDE, Serial-Attached SCSI

Recommended-Books:

3. Modern all about floppy disk and drives by Manhar Lotia and Pradeep Nair BPB Publication
4. PC Hardware” by Michael Meyers, Scott Jernigan. TMH Edition
UNIT - 1    INTERNET CONNECTIVITY
Internet connection trends, Broadband Internet Access types, cable TV (CATV), Digital Subscriber Line (DSL), Wireless Broadband, Satellite Broadband, Integrated Services Digital Network (ISDN), Leased Lines, Comparing High Speed Internet Access, Dialup Modems, Modem standards and protocols, bits and baud rates, modulation standards, Error correction protocols, Data compression standards, 56Kbps Modems, Internet connection security, Sharing your internet connection, routers for internet sharing, Modem/router status LEDs. (Book: Upgrading and Repairing PCs by Scott Mueller)

UNIT – 2    INSTALLING AND SUPPORTING I/O DEVICES
Basic principles to support I/O Devices, Types and Features of I/O Devices, I/O ports on the motherboard, display devices, expansion cards, Installing Input Devices: How to Install a Keyboard and Mouse, How to Install a Touch Screen, How to Install a Barcode Reader, How to Install a Fingerprint Reader, How to Install a KVM Switch, Installing and Configuring I/O Devices and Ports: using device manager, using ports on the motherboard, Installing and configuring adapter cards, Troubleshooting I/O Devices: Troubleshooting motherboard i/o ports, troubleshooting keyboards, troubleshooting monitors and video cards, troubleshooting other adapter cards (CompTIA A+ Guide to Hardware Managing, Maintaining and Troubleshooting)

UNIT – 3    Building/Upgrading systems
System components: Case and Power supply, Processor, Motherboard, Memory, HDD, Removable storage, Input Devices, Video card and display, audio hardware, accessories Hardware and Software resources, System assembly and disassembly Motherboard Installation: Installing CPU and Heat Sink, Installing Memory modules, mounting motherboard in the case, connecting the power supply, connecting I/O and other cables to the motherboard, Installing the drivers, Installing a video card, Installing additional expansion cards, replacing the cover and connecting external cables, System startup, Installing the operating system, Troubleshooting Installation. (Book: Upgrading and Repairing PCs by Scott Mueller)

UNIT – 4    PC Diagnostics, Testing, and Maintenance
**Recommended Books:**

3. Modern all about floppy disk and drives by Manhar Lotia and Pradeep Nair BPB Publication
4. PC Hardware” by Michael Meyers, Scott Jernigan. TMH Edition
Paper 7: Data Communications & Computer Network Credit: 04
Total Marks: 100 (70 External+30 Internal)
Total Hours requires: 60 Hrs.

UNIT I:

Bandwidth utilization: Multiplexing and Spreading, Multiplexing, Spread Spectrum, Transmission Media, Guided Media, Unguided Media: Wireless, Switching, Telephone Networks, Dial-up Modems, Digital Subscriber Line, Cable TV Networks, Cable TV for Data Transfer

UNIT II:
Error Detection and Correction, Introduction, Block Coding, Liner Block Codes, Cyclic Codes, Checksum, Data Link Control, Framing, Flow and Error Control, Protocols, Noiseless Channels, HDLC, Point-to-Point Protocol, Multiple Access, Random Access, Aloha, Controlled Access, Channelization, IEEE Standards, Standard Ethernet, Changes in the Standard, Fast Ethernet, Gigabit Ethernet, IEEE 802.11 Wireless, Bluetooth

UNIT III:

UNIT IV:
Application Layer: Domain Name System, Name Space, Domain Name Space, Distribution of Name Space, DNS in the Internet, Resolution, DNS Messages, Types of Records, Registrars, Electronic Mail and File Transfer, Remote Logging, Telnet, Electronic Mail, File Transfer

1. **REFERENCE BOOKS:** *Introduction to Data communications and Networking*, W. Tomas I, Pearson education.

2. *Data Communications and Networking, Fourth Edition* by Behrouza A. Forouzan, TM


Web Design and Development

Unit I: Designing With HTML

Designing & Planning Web Pages, Website Evaluation and Rubric Creation
Creating HTML Documents
Basic XHTML Markup, HTML Basics, Headings, Paragraphs, Formatting Text, HTML Elements, HTML Attributes, Style and Color, XHTML Lists, Creating Links, Creating a Data Table
HTML Basics, HTML Headings Sizes, Paragraph Styles & Line Breaks, Adding Links & Images, Center and DIV Tags, Creating Clean Code, Creating Lists, Using Fonts & Color in Text, Using Anchors in Text, Hexadecimal, Most Common HTML Mistakes,
More on Graphics, Tables, Borders & Cells, Adding Audio, Working With Frames, Adding Forms,

Unit II: Creating Style Sheets with CSS


Unit III: Javascript Introduction

What is JavaScript?, PreRequirements, Creating a JavaScript file, Tools Required
Basics of Javascript, Structure of a JavaScript Code, DataTypes, Variables & Operators
Looping & Conditional Statements, Functions, Types & Objects, Arrays, Numbers
Strings, Dates, Objects

DOM (Document object model)
What is DOM?, Element Nodes, Getting Element Nodes, Changing DOM Content, Creating DOM Elements, Events Overview, Responding to Mouse Events, Form Events, Timers

Unit IV: PHP Programming

Introduction PHP and MySQL, Benefits of using PHP MySQL, Setup of PHP Environment, Testing the Page, Troubleshooting Installation Errors, PHP Programming Concepts, Write your First PHP Program
Coding with PHP
Embed PHP in HTML / HTML in PHP, PHP Data Types, Variables in PHP, SuperGlobal Variables, Operators in PHP, Conditional Statements, Loops (For, While, Do While, Foreach)
PHP Functions, Using Functions in PHP, Userdefined Functions, Predefined Functions
Common Functions, String Functions, File Functions, Date Functions, Hash Functions, Mail Function
MySQL Database Training
What is Database?, Understanding an RDBMS, Understanding Tables, Records, and Fields
SQL Language, Using the MySQL Command-Line Client, Working with MySQL Admin
Working with PHP MyAdmin, Creating Databases, Types of Databases,
Creating Tables in Database, Specifying Field Data Types, Selecting a Table Type, Altering Tables, Altering Table and field Names, Altering Field Properties, Adding and Removing Fields and Keys, Altering Table Types

Backing Up and Restoring Databases and Tables

SQL Queries: Inserting Records, Editing and Deleting Records, Performing Queries, Retrieving Specific Columns, Filtering Records with a WHERE Clause, Using Operators, Sorting Records and Eliminating Duplicates, Limiting Results, Using Built-In Functions, Grouping Records, Joining Tables, Using Sub queries, Using Table and Column Aliases

Reference Books:
1. HTML 5 and CSS 3 made simple by Bayross, BPB Publications
2. Web Enabled Commercial Application Development Using Html, Dhtml, javascript, DHTML and PHP by Bayross, BPB Publications
4. W3Schools.com
Paper 8: Elective Paper (Optional) Credit: 04
Total Marks: 100 (70 External+30 Internal)
Total Hours requires: 60 Hrs.

Server Administration : Windows and Linux

UNIT I

Installing, Upgrading and Deploying Windows Server 2008, Configuring Network Connectivity, Active Directory and Group Policy, Application Servers and Services

UNIT II


UNIT III


UNIT IV

Routing Network traffic, NAT, Configuration of SMTP, DNS, Web Server, FTP and NFS

Reference Books :

1. Linux Server Step-by-Step Configuration Guide, Don r Crowly
2. Windows Server 2008 Unleashed, Rand Morimoto, Michael Noel
Programming with C++

UNIT - I

1. Introduction to C++
   Starting with C++
   How C++ evolved from C?
   Features of C++
   Procedure-oriented programming
   OOP vs. procedure-oriented programming
   The basic anatomy of a C++ program
   Starting with a simple “Hello World” program
   Compiling, linking and running a C++ program

2. Object-Oriented Programming Concepts
   Abstraction
   Inheritance
   Polymorphism
   Data Binding
   Encapsulation
   Classes, subclasses and Objects

UNIT II

1. The Basics of C++
   Base Data Types and sizes
   User-defined Data Types
   Variable Declarations, Variable Names
   Dynamic initialization of variables
   Constants and its types
   Character Constants
   String Constants
   Standard input and standard output
   Formatted input – cin
   Formatted output – cout
   Use of << and >> operators

2. Working with Operators and Expressions
   Operators
   Arithmetic Operators
   Relational Operators
   Assignment Operator
   Logical Operators
   Increment and Decrement Operators (++ and --)
   ‘Operate-Assign’ Operators (+=, *=, ...)
   Expressions
   What are Expressions?
   Operator Precedence
Precedence and Order of Evaluation
Conditional Expression
Casting and type conversion

3. Controlling the Program Flow
Decision control
if
if – else
if - else if
Loop Control
while
doi – while
for
break
continue
Case Control
switch
goto

UNIT III

1. Using Functions/Procedures
Why Functions?
Anatomy of a Function
Returning values from functions
Arguments Passed by Value
Passing Addresses of Arguments
Concept of variable scope and scope rules
Static and automatic variables
Global variables
2. Pointers and Arrays
Pointers
What is a Pointer?
Pointer Initialization
Pointer Operators
The & Operator
Pointer Arithmetic
Functions and pointers
Understanding Arrays
Arrays
Initializing Arrays
Passing Arrays to Functions
Pointers and Arrays
Pointer to an Array
Array of pointers
Strings
String I/O
cin and cout member functions
Standard C String functions
Arrays of Strings
UNIT IV

1. Binding data and functions
   Concept of a class
   Defining a class
   Creating an object
   Object Scope
   Data Abstraction
   Enforcing Data Encapsulation
   ‘this’ Pointer
   Dynamic creation of objects
   Constructors and Destructors
   The Default Constructor
   The Destructor
   Parameterized Constructors
   Copy constructor
   Defining member functions
   Methods and access modifiers
   Accessing class data and methods
   Friend class and friendly functions
   Returning objects
   Arrays of Objects
2. Function and Operator Overloading
   Function Overloading
   Using overloaded functions
   Rules for overloading
   Operator overloading and its uses
   Overloading unary and binary operators
   Overloading the assignment operator
   Overloading the << Operator
   Overloading the increment and decrement operator
   Dealing with strings using operators
   Converting data types
   Basic to class type
   Class to basic type
   Class to another class type

Reference Books:
Let us C, Yashawant P Kanetkar, BPB, NewDelhi
Let us C++, Yashawant P Kanetkar, BPB, NewDelhi
Object Oriented Programming with C++, E. Balaguruswamy, Tata
McGrawHill
Waite Group’s Object Oriented Programming in C++, Robert Lafore, Galgotia
Windows 7 Configurations

UNIT 1  INTRODUCTION OF WINDOWS 7

What’s New in Windows 7, Installing and Configuring Windows7, Obtaining Help and Support, Personalizing Windows 7, Adding, Removing and Managing Programs, Using Internet Explorer, Internet Explorer Compatibility, Security and privacy

UNIT 2  FILE MANAGEMENT

Overview of organizing files and information, using windows search, overview of advanced file management, backup, restore and recovery

UNIT 3  TUNING, TWAKING AND TROUBLESHOOTING

Tuning Up and Monitoring performance, performing routine maintenance, using advanced system management tools, deployment and migration, automating windows 7, troubleshooting windows errors and crashes

UNIT 4  WINDOWS 7 AND PC HARDWARE

Setting up and configuring hardware, managing disks and drives, using pen, touch and voice input

Recommended Books:

1. Windows 7 Inside Out by Carl Siechert, Ed Bott, Craig Stinson
2. Troubleshooting Windows® 7 Inside Out: The ultimate, in-depth troubleshooting reference (Inside Out (Microsoft)) by Mike Halsey
Paper 8: Elective Paper (Optional) Credit: 04
Total Marks: 100 (70 External+30 Internal)
Total Hours requires: 60 Hrs.

Emerging Technology

UNIT 1 PORTABLE PCS

Portable Computing Devices: Desktop Replacements, Desktop Extenders, PDAs
Enhance and Upgrade the Portable PC: PC Cards, Limited-Function Ports, General-Purpose Ports, The Modular Laptop
Managing and Maintaining Portables: Batteries, Power Management, Cleaning, Heat, Centrino Technology, Express Card

UNIT 2 NOTEBOOKS

Special considerations when supporting notebooks, warranty concerns, service manuals and other sources of information, diagnostic tools provided by manufacturers, the OEM operating system build, caring for notebooks, supporting notebook peripheral devices, port replicators and docking stations, PC card, CardBus, and expresscard slots, using Bluetooth, cellular, and wifi connections, power and electrical devices, power management, Input devices, video, troubleshooting, replacing and upgrading internal parts, upgrading memeory, replacing a hard drive, disassembling and reassembling a notebook computer

UNIT 3 TABLETT PCs

The world of tablet pc, redefining the pc experience, connecting to your office and beyond, discovering pen basics, when your keyboard..isn’t, talking to your tablet pc, thinking ink with journal, stuck on sticky notes, kicking back with ebooks and inkball, creating presentations just got easier, communicating with tablet PC, ten neat thing you can do with your tablet pc, top ten applications for your tablet pc, ten real-world uses of your tablet pc, overview of android and windows os and applications for tablet pcs

UNIT 4 LAPTOPS

Laptop system maintenance and assembly, processors, motherboards, memory, power, expansion buses, pcmcia, hard disk storage, removable storage, graphics and sound, communication, laptop keyboards and pointing devices, portable system accessories, software/os system, problem solving and troubleshooting, repairing,

Overview of Smart Mobiles and devices

Recommended Books:

2. Upgrading and Repairing Laptops” by Scott Mueller Publisher: QUE
3. Tablet PCs by Dummies
4. PC Hardware” by Michael Meyers, Scott Jernigan. TMH Edition

PGDHT A
Department of Electronics
Saurashtra University, Rajkot
SET OF 10 PRACTICALS BASED ON PAPER 5, 6, 7 & 8